

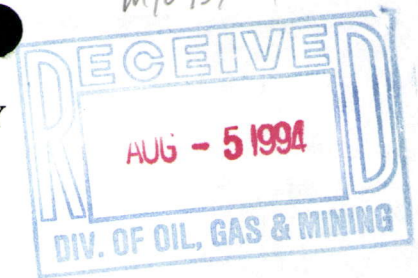


# State of Utah

## DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER QUALITY

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July 24, 1994

Mr. Glen Eurick  
Barrick Resources Inc.  
P.O. Box 838  
Tooele, Utah 84074

Re: Mercur Mine Tailing Impoundment  
Conceptual Closure Plan - Permit No.  
GW450002, Review Comments

Dear Mr. Eurick:

We have studied Barrick's Conceptual Closure Plan for the above referenced facility, submitted to our office on December 6, 1993. The proposed closure plan calls for evaporative dewatering of the tails followed by two years of consolidation. Contouring for flood routing compliance and the placement of a 12-inch thick topsoil layer vegetated with a final reclamation seed mix. We are unable to approve the plan because it does not provide for sufficient isolation of the tailings from the environment nor does it provide a cover for the tails that will sufficiently prevent the infiltration of precipitation into and through the tailings. The following comments must be addressed before a modified version of this Conceptual Closure Plan can receive our approval.

1. **Post Closure Monitoring**

A post closure monitoring plan is absent from the closure plan. It is anticipated that Barrick will monitor surface and ground water at the site for at least 20 years following the completion of closure procedures. Monitoring of the site to insure that flood control measures and land contouring remains functional and stable is also necessary. A section of the closure plan must specifically deal with these issues. This section should outline Barrick's continuing commitment to monitor the site following closure.

2. **Division of Water Rights Regulatory Requirements**

Your plan indicates that you will be required to attain approval from the Division of Water rights for elements of your closure plan relating to breaching of the final dam and flood control structures.



These general requirements are appropriate. Although a water depth of 5 feet during the 100 year flood is acceptable the final design must be such that after the flood has been attenuated the pond must be fully draining such that none of the precipitation or snow melt water permanently ponds above the tailings.

3. **U.S. Bureau of Land Management Draft Cyanide Management Policy**

We recognize that not all of the draft policy requirements are practical for the Mercur tailings impoundment. For example dewatering of the tailings solids and tailings detoxification. One requirement of the draft policy that should be included in your Closure Plan is the capping of the tailing impoundment with low permeability material. Because dewatering and detoxification will not be practical this requirement becomes essential.

4. **Public Health and Safety**

Several pages of the closure plan discuss the potential threat to the public from direct exposure to the tailings solids or meteoric water seepage from the tailings. Given that you have determined it is a threat to the public health, why is only one foot of top soil proposed as a cover for the tailings? Erosion through one foot of top soil can easily occur leaving the tailings exposed. Direct human contact would then be possible and runoff could also contain tailing materials. Having built a tailing impoundment so high in the water shed, Barrick now needs to take appropriate measures to effectively isolate the tailings and to insure their long term in place stability. One foot of vegetated cover will not achieve this criteria.

5. **Ground Water Quality Protection**

The estimation of seepage from the impoundment in the closure plan is oversimplified and without sufficient basis to justify the assertion that the post closure seepage rate will be only 9 gallons per square foot per year. The depth of the tailings will vary from 1 foot to over 200 feet. How was the average depth of 115 feet arrived at? Simply stating that the bottom 8 feet of tailings will consolidate to a permeability of  $1 \times 10^{-7}$  cm/sec because of over burden pressure without providing supporting calculations is not sufficient to support the claim. The tailing impoundment liner was built over many years of construction using different liner specifications, materials and thicknesses. The over generalized approach of the closure plan needs to be modified if Barrick wants to include a seepage estimate in a Closure Plan for Executive Secretary approval.

On page 28 of the plan, several mistakes were made in citing the infiltration modeling done by DWQ. Additionally, the proposed cap design modeled was significantly different from the one proposed in the closure plan. The cap modeled was for the Dump #1 which had a 12 inch top soil layer, 36 inches of subsoil and 12 inches of compacted clay compared to just 12 inches of top soil.

An evaporative zone of 24 inches was assumed as well as a minimum 2% slope. All these factors combined with varying permeabilities of the clay were modeled. For a clay with  $1 \times 10^{-5}$  cm/sec permeability, the infiltration through the clay was 2.27 inches per year. With a permeability of  $1 \times 10^{-7}$  the infiltration was 1.68 inches a year. Without a clay barrier, as proposed for the tailings impoundment, the infiltration would be significantly higher. For purposes of the modeling performed the average monthly precipitation recorded in recent years at Mercur was multiplied by 1.5. Given the final elevation of the tailings pond to be 7360, this multiplier is not overly conservative for this particular location. Thus the predicted 13.5 acre feet of recharge from the conceptual closure plan is low for the proposed vegetated top soil only cap. The conclusions with respect to this information on page 35 are thus without technical justification.

Without sufficiently steep slopes and an extensive collection system a lateral drainage layer would serve little or no function. Thus, we agree that the installation of a lateral drainage layer on a facility this large would not be beneficial. However, we disagree with your conclusion that a clay infiltration barrier would not significantly reduce infiltration and enhance evapotranspiration. The construction of a clay cap on the tailings may indeed be difficult. However, with a random fill depth sufficient to isolate the tailings from future surface exposure, a clay cap could easily be constructed.

6. **Golden Gate Pit/Pond**

The closure plan indicates that the Golden Gate Pit will have a storage capacity of 2,890 acre-feet of water. Given the characteristics of storm water from sampling done in the past couple years, this pond probably would not meet the minimum standard of the ground water rules for clean water discharge. Thus a ground water discharge permit may be required if the pit is to become a major infiltration basin for the entire mine area. It is recognized that Barrick cannot prevent direct precipitation into the pit that would probably then pond in the bottom and thus cause some infiltration into the ground water. We are only questioning the wisdom of using the pit as an end point for water originating outside the pit. Minimizing the flows to the pond and reducing the concentrations of contaminants in those flows may be necessary to obtain a permit by rule determination under the storm water exemption of our rules. Such measures may also be required if a permit is called for. Because the reference to this type of use for the Golden Gate Pit has not been previously discussed, we would like to invite you to discuss your plans concerning the pit during your August 4, 1994 meeting with Division staff or at your convenience thereafter. Some of the questions that arise from this issue are as follows:

1. What areas and facilities of the mine will contribute runoff water to the Golden Gate Pit?
2. What are the expected chemical characteristics and quantities of runoff water?



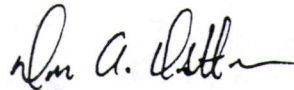
3. What would be the bottom elevation of this pond and what geologic formation(s) will be receiving infiltration from this pond?

7. **Surface Drainage**

Constructing a spillway from Reservation canyon to Manning canyon by blasting through the rock on this saddle may be feasible. The closure plan did not appear to account for two potential problems. First the spillways would have to be constructed such that materials from the side slopes would not slide off into the channel and thus block the channel. Given the topography it appears that significant reshaping of the slopes in the area will be required. Second transferring the Reservation Canyon water to Meadow canyon where the drainage capacity of the piping beneath Dump #3 is insufficient would result in problems not addressed in the closure plan.

If you believe it is necessary to meet to discuss the issues above, please contact Dennis Frederick at 538-6146. According to the tailing impoundment permit, Barrick shall resubmit the Conceptual Closure Plan, within 60 days of receipt of written notice, by the Executive Secretary, of any deficiencies therein.

Sincerely,



Don A. Ostler, P.E.  
Director

DAO:DAF:mhf/wfm

cc: Tooele County Health Department  
Division of Oil, Gas & Mining  
Bureau of Land Management